egg, soon develops a wall about itself, separating it from the abandoned tube. Sometimes the embryospore nucleus divides, giving two cells; then the anterior cell behaves like an ordinary embryospore; or if a monosiphonous filament of several uninucleate cells is formed, the anterior cell again functions. Only in weak and poorly developed cultures did SAUVAGEAU observe erect branches from the embryospore; in these cases each erect branch behaves in the manner described.

If the embryospore is to develop a male gametophyte, its diameter is increased little or none, elongation is very rapid, but the entire structure remains very minute. The antheridia develop as rounded colorless buds, each enclosing a single sperm, which after its escape is seen to be motile, colorless, and laterally biciliate.

Fertilization was not observed, but SAUVAGEAU assumes that it occurs and that from the fertilized egg the plantlet or sporophyte develops immediately. His account from this stage on differs in few essentials from the accounts of other workers, the stipe and blade being differentiated at a very early stage.

It is to be regretted that at the critical stages details are not more clearly given. However, it is evident from this account, as also from that of DREW, that there are certain phases in the life history of the Laminariaceae which are in need of critical investigation, especially from a cytological point of view. DREW concluded that as a result of conjugation of isogamous gametes a filament (the sporophyte) developed which in turn gave rise to the plantlet (the gametophyte). SAUVAGEAU concludes that the gametophyte comes very early in the cycle; in fact, it is practically a walled zoospore, and the plantlet which is produced as the result of fertilization of the egg is the sporophyte. It would seem that a careful investigation might clear up the haziness which still remains about these phases in the life history.—MABEL L. ROE.

Tannins.—MOELLER[9] has noted peptization phenomena in tannin solutions, and believes that they form the basis of the process of tanning. A tannin extract contains two sorts of substances: (1) a tannin that is soluble in water, and (2) an accompanying substance, a gel, which is insoluble in water. With pyrogallol tannins this accompanying substance is called ellagic acid, and with pyrocatechin tannins it is called phlobaphene. The ellagic acid and phlobaphene, while insoluble in water, are soluble in the tannin solution; that is, the tannin peptizes the ellagic acid gel and the phlobaphene gel, the tannin being called the peptizator and the gel the peptized substance. In the process of tanning the hide adsorbs the peptizator and the gel coagulates out, surrounds the fibers of the hide, and leather is formed. He says a true solution cannot tan a hide, but only a peptized solution, and that all tanning solutions

[9] MOELLER, W., Die Peptisationserscheinungen in Gerbstofflösungen. Kolloid. Zeitsch. **16**:69–76. 1915.

contain a gel held in solution as a hydrosol by the action of a peptizator. Purified tannin solutions do not tan, and the more "impure" the solution the better the tanning effect. Watery tanning solutions on standing in the air undergo changes that increase their tanning value, owing to the formation of an insoluble product that becomes peptized.

MOELLER finds a similar situation exists in the artificially prepared tanning solutions. In chinon tanning solutions the chinon takes the place of a peptizator, while hydrochinon is the peptized gel. In the mineral tanning solutions an insoluble metallic hydroxide is peptized into the solution condition by the peptizing action of the acid salt solution. According to MOELLER's view, the properties of a tanning extract depend upon the equilibrium between the peptizator and the peptized substance, and the character of the leather depends upon the nature and quantity of the peptized gel that is taken up by the hide fibers.—F. E. DENNY.

Taxonomic notes.—Miss GILKEY[10] has published a revision of the Tuberales of California, preceded by an account of the distribution of truffles in California, their economic importance, and their morphology and phylogeny. Accompanied by very full discussion, 11 genera are presented, including 32 species, the largest genus being *Tuber*, with 12 species. A new genus (*Hydnotryopsis*) and 15 new species are described, distributed among the following genera: *Hydnocystis*, *Genea* (3), *Hydnotrya*, *Tuber* (6), *Piersonia*, *Geopora* (2), and *Hydnotryopsis*.

WEST[11] has described a new genus of mycorrhizal fungi associated with the roots of the various genera of Marattiaceae. He names it *Stigeosporium*, and regards it as of special interest inasmuch as it produces "under natural conditions distinct reproductive bodies within the tissues of the host root."

WILLIAMS[12] has published a list of Peruvian mosses based upon two collections. It includes 71 species, among them 6 new species in the following genera: *Leptodontium*, *Globulina*, *Tortula*, *Grimmia*, *Bryum*, and *Hygrohypnum*.—J. M. C.

[10] GILKEY, HELEN MARGARET, A revision of the Tuberales of California. Univ. Calif. Publ. Bot. **6**:275–356. *pls. 26–30.* 1916.

[11] WEST, CYRIL, *Stigeosporium Marattiacearum*, gen. et sp. nov. Ann. Botany **30**:357. 1916.

[12] WILLIAMS, R. S., Peruvian mosses. Bull. Torr. Bot. Club **43**:323–334. *pls. 17–20.* 1916.